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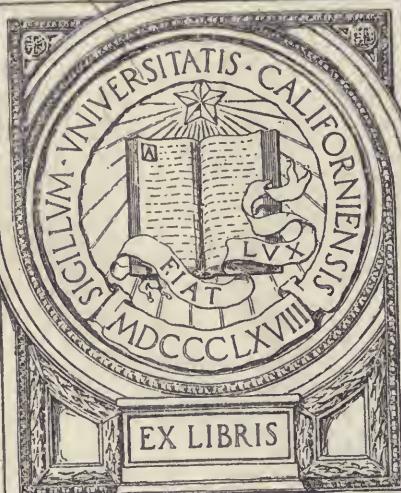


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THEORETICAL DEPRECIATION

A menace to the public and the investor

1920

by

George N. Webster

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THEORETICAL DEPRECIATION

A menace to the public and the investor

The most serious menace to which investors in the securities of public service corporations are exposed to-day results from their failure to comprehend and to combat unsound and destructive theories of valuation, which, when employed in the determination of the value of their properties for purposes of rate regulation, operate to confiscate a very substantial percentage of their investment.

The term "confiscate" is used advisedly. If an investor has expended, for example, \$100,000 in plant and equipment devoted to the public service and has rendered service therewith for a number of years at legal rates, yielding a legitimate return upon his investment and nothing more, and has collected from his patrons nothing representing a return to him of his investment or any part of it, and if his property is then appraised and, as the result of the method employed, is found to have a present value of say \$70,000 and the rates he is permitted to charge are adjusted so as to yield a return on only \$70,000, then his investment, to the extent of \$30,000, *has been confiscated*.

When it is considered to what extent owners of property are protected by federal and state constitutions, federal, state and municipal laws, municipal and police regulation and a vast legal machinery, against the confiscation, expropriation, seizure or theft of their property and by what simple means these agencies of protection may be invoked in behalf of the individual or corporation, it is amazing to observe the extent to which property is confiscated under the guise of rate regulation, with hardly a protest being raised by the victims. They are bewildered by reiterated protestations that jus-

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tice must be done to investors, in the very opinions which destroy, in part, their investments.

Furthermore, when it is considered that the adoption of these methods has already resulted in the confiscation of hundreds of millions of dollars invested in public utility properties, and that its general adoption would result in the confiscation of several billions more, it would appear as though it were high time for those whose interests are thus threatened to bestir themselves in defense of their properties and for those who are clothed with authority and power to determine rate cases, involving a consideration of the element of property, to inform their minds as to the fundamental economic facts, which are of paramount importance and which must be given controlling consideration if the interests of the public and of the investors are to be conserved.

No one will dispute the fact that the interests of the investor and of the public are so interwoven and inter-dependent that neither can be advantaged at the expense of the other, nor exploited for the benefit of the other; that each must share in the other's prosperity or adversity and that they who hold to the contrary and whose activities disregard this fundamental fact are either short-sighted mischief-makers or demagogues.

Not a little of the pernicious activity which, for the past ten or fifteen years, through drastic rate regulation based on false theories of valuation, has been sapping the vitality of our public service companies and paralyzing their efficiency, may be attributed to German propaganda, the mouthpieces of which have included certain politico-scientific periodicals, of supposed respectability and patriotism, at least one of which eliminated evidence of its German connections in Berlin from its title page, only when we declared war upon Germany.

The method of unsound valuation against which this article is directed may be described briefly as the "*cost less depreciation*" method. The "*cost*" may be "*original cost*," "*average cost*" or "*present cost*." The *deprecia-*

tion which is deducted therefrom and which may be said to have its origin in the concept that used property is less valuable than new property, is based upon the assumption that used property becomes uniformly less valuable during the period of its alleged life expectancy, starting at one hundred per cent. value and ultimately reaching zero value. The amount to be deducted is computed by finding the ratio of the expired life to the assumed total life and by applying that ratio to the "cost"; the amount thus obtained, deducted from "cost," is supposed to represent the "present value."

The advocates of the depreciation theory would state the formula in this way: A unit of equipment costs \$10,000; it had a life expectancy when installed of thirty years; ten years have elapsed; ten years is one-third of thirty years; one-third of \$10,000 is \$3,333.33; this deducted from the "cost" leaves the "present value" of the unit of equipment as \$6,666.67.

It is not conceivable that any one could give the subject of depreciation of the kind here illustrated serious consideration without discovering its utter fallacy. That so few have raised their voices in protest against it must be attributed to the fact that few have really considered it seriously. These, who are unalterably opposed to the theory, include some economists, some members of the judiciary, a few of the Public Service Commissions, some executives of corporations and some members of the legal, engineering and accounting fraternities. They have discovered that the question is not one of engineering, nor of accounting, but one of economics and finance and the legal protection of property rights.

There are many engineers of honest intention who pretend, or even think, they have knowledge of this subject, who while competent in the ordinary branches of construction engineering are utterly lacking in a real and fundamental understanding of this dangerous fallacy of "theoretical depreciation." [initials]

The problem is, in fact, not one of engineering nor is it one that engineering training fits an engineer to properly understand. The same may be said of the accountant and his training. The subject is one primarily of applied economics and must be studied from the standpoint of the mutual economic interests of the consumer and the investor.

There is much to learn and many pitfalls of false logic and misleading partial reasoning to be avoided and combated. So far as the honest engineer and accountant is concerned, in great part his countenance of the error has resulted from his assumption that the problems involved are simple and through his acceptance of the superficial conclusions of specious presentations.

Those who advocate it as a business—the professional depreciationists—are in a class by themselves. We will speak of them later.

The most sinister support which the depreciation theory receives may be traced to socialistic propaganda. Concededly, the ultimate goal of socialism is state ownership of all instrumentalities of industry. The immediate objective is state ownership of all public utilities, or state operation *without* ownership. The so-called "*progressives*" in the Republican and Democratic parties co-operate with the socialists in the attack on the immediate objective. The socialists cannot expect to attain their ultimate object of state ownership, or state operation *without* ownership, of all industries and all property until they have first brought under federal, state or municipal ownership or operation *all of the public utilities*. For the accomplishment of the latter, they have a perfectly definite, settled program, viz.: the strangulation of public service companies through rate regulation, service regulation and taxation, to the point where the companies themselves will seek relief, in public ownership, from absolute bankruptcy and accept almost anything they can get for their properties. One means to this end is to insist on franchise requirements adapted to periods of lower prices, as

in the case of the street railways. An equally efficacious operation is to exploit the theory of depreciation as a means of reducing value of public service properties to a bargain basis. That the application of the theory in any particular instance results in immediate partial confiscation is what commends it to them. They would confiscate all of the property if they could do so. As this class, however, constitutes but a negligible minority, it may be assumed that its activities will not long delay the universal recognition of fundamentally and economically sound principles in rate regulation. There are unmistakable signs that the country is exasperated by radicalism.

Those who have been impressed by the theory have been beguiled by false analogies. They have been led to liken a railroad system, representing an investment of millions of dollars and composed of a myriad of units of plant and equipment, to an article of furniture, a suit of clothes or some other familiar object, and to believe that as the used table has lost some of its value so the used railroad has lost some of its value; that railroad-fares should be based upon "value" so conceived and that a *used* railroad should charge a lower fare than a *new* railroad. The fact that the analogy, however plausible, is fallacious to the point of absurdity has eluded their understanding.

The analogy is false because it assumes, in respect of an instrument employed in producing a service, that its *age* affects the value of the service rendered and the price which should be charged therefor. The falsity of the assumption becomes at once apparent when it is considered that the individual, as the possessor of a chair and table, and the railroad company as the possessor of railroad plant and equipment, are, in a sense, in the same position in regard to their respective properties. In both cases, the properties, by performing their respective functions, enable their owners to *render service*. The functioning, under the direction of the railroad company, of the railroad plant and equipment, enables the company

to supply a railroad service. The functioning of the chair and table, as office furniture, enables the individual to render service to his clients. He can transact just as much and just as important business at an old desk as a new one; the age of the chair he sits on is no criterion of his service efficiency nor of the value of the service he renders; not being a furniture dealer, the comparative value new and second-hand, of his office furniture, enters not at all into the determination of any of his business transactions, nor of the amount of the bills he renders for his services; and nevertheless he accepts, offhand, the proposition that the railroad-fare he pays should be dependent, in a measure, upon the age of the upholstery of his seat in the train, even though he may be unable to detect from any visual examination whether it is one year old or ten.

When the services of a professional depreciator are retained by a municipality, it is in order that by the exploitation of his theory of depreciation a reduction in rates may be effected, not because the service has in any way deteriorated but solely because the plant and equipment employed in rendering it, while in every way as good as new and functioning just exactly as well and possibly infinitely better than when it was new, is *de facto* not *brand new*.

The professional depreciator refers to the plant and equipment as second-hand and disingenuously inquires if second-hand plant and equipment is worth as much as new plant and equipment. The answer is decidedly yes. Divorced from its earning capacity, a new plant would be only a heap of junk. Coupled with an earning capacity based upon the recognition of sound economics, justice and common sense, the second-hand plant and equipment, in operation, is worth substantially more than a corresponding amount of new plant and equipment. Aside from the advantage of having a market for its product and an established business, such a plant has "found

itself," all the kinks have been ironed out, the plant organization has been perfected, and it is working a great deal more efficiently and economically than a new plant could possibly work.

In substance, the professional depreciator assigns to the various units of plant and equipment a second-hand value and then blandly asks if the value of the whole can be greater than the sum of the parts. This specious proposition disregards the obvious facts, (1) that the investment of the owners is in the plant as a whole, (2) that the investment is not made for the purpose of creating a museum of second-hand plant and equipment but because it *has to be made* in order that the investors may render a perpetual service in accordance with their franchise, (3) that the investment remains intact until it has been repaid in part or in whole and (4) that there has never been any contract or agreement between investors and their patrons for the repayment of any part of the investment in plant or equipment *in service*.

The *modus operandi* of the professional depreciator, as stated, is to guess at what he terms the "life expectancy" of the plant and equipment in service and having computed the percentage of "expired life" he uses the same percentage to compute "expired value." He does not like to say "expired investment." He avoids the use of the word *investment* because he knows it will tangle him all up. He does not want to be asked to explain what he means by *expired investment* or *what has become of the expired investment*; or to explain how an investment can *expire*. These things embarrass him. He sticks to *value*, because he knows that *value* is an elusive and ambiguous term and that there is less likelihood of some one pinning him down to admitting that he *doesn't know what it means*, than there is of some one pinning him down to an admission that an investment *can not expire*. He knows nothing about accounts and less about engineering. In order to *perform*, he has to have a figure to start with. If, with the help of an ac-

countant, he can get the original cost of the property, he uses that and calls it "reproduction cost," although he knows it is nothing of the kind. If an engineering valuation *new* is presented to him he will generally accept it and call it too "reproduction cost." He is not particular. All he wants is a principal sum on which to use his depreciation method. From either he will deduct a percentage corresponding to his guess as to the percentage of the "expired life" of the property. He will, for example, guess that the life expectancy of the property is thirty years. He will guess that ten years of the life expectancy have expired. That equals thirty-three and one-third per cent. Therefore, the present value of the property is equal to the reproduction cost less thirty-three and one-third per cent. In order to appear really scientific, he calls his *present value* the *rate base!* Like a priest of some mystic cult, he signifies the exclusiveness of his special learning by the liberal use of a new and terrifying terminology. He displays weird mathematical diagrams, covered with wriggling, portentous lines like a robed sooth-sayer who surrounds himself in his darkened chambers with the mummery of outlandish alembics and astronomical charts. Thus these learned assassins of values impose upon city councilmen and public service commissioners and furnish a basis for what they are inclined to believe or what they deem it necessary to their political fortunes to believe, and, gathering their fees, depart. From the decisions of councilmen and commissioners, there is an appeal to the courts on the law, but not always on the facts. Value is a matter of fact. The courts are unanimous in holding that value, in a rate case, is not "exchange value." What kind of value is it then that is not exchange value and yet can be expressed in dollars and cents? The best that judges can do is to say that "value is not a matter of artificial rules and formulae but is a matter of judgment." Neither the courts, nor the commissions, nor the alleged experts nor anybody else knows what that value is, about which they talk so solemnly.

Even upon so violent an assumption as that of a man who has invested \$10,000, in a non-competitive enterprise of definitely limited life of say ten years, at the expiration of which period his plant and equipment, still in perfect working order, must be scrapped, it could not by any process of reasoning be demonstrated that the price charged for the service rendered could be reduced, at any time during the period, because, forsooth, his plant was older at the end of the first year than when he started and became progressively older until it was scrapped. The reason is obvious. In this case, which, as will be shown, bears no analogy whatever to a public service company, if the investor is to come out whole, he *must* collect, in his rates, in addition to the cost of his service, (1) interest on his investment, uniformly, during the entire period, and (2) an annual sum which at compound interest will, at the end of ten years equal¹ the amount of his investment. In the case of a public service company, however, there is no reason or justification for thus amortizing in whole or in part the investment in plant and equipment.

The world is expanding. This country is expanding more than any other. There are centuries of expansion before it. Then why dream of *amortizing* investment in public service companies? Almost without exception they are *growing* not *shrinking*. It will be time enough to talk of amortizing investments in them when, if ever, there are signs of *shrinkage*.

The consideration of *age* enters no more into the question of the *rates* of a public service company, which is able to and does render the service it was organized to render, than does the *age* of a *taxis*, or of its *driver*, or of the *clothes he wears*, enter into the question of the *fare*. A driver twenty years old with a new car and a new uniform can charge no more than a man of sixty with a ten-year-old car still operating efficiently. It is *transportation* the passenger is buying—and he expects to pay

uniformly for a *uniform service*, regardless of the age of the equipment.

Nor does a lawyer or a physician expect to regulate his fee by the age of his office furniture, as one might think he should from the arguments of the professional depreciator. A laborer of twenty with a new pair of overalls draws the same rate per diem as the laborer of sixty with a pair of wornout overalls. Both do a uniform day's work for a uniform day's pay and *age cuts no figure* so long as *uniformity in service capacity* exists.

A celebrated lawyer who died within a year and who bequeathed many millions of dollars to a great college had in his office the simplest and oldest furniture the writer ever saw. Furthermore, his earning capacity increased annually to the day of his death at the age of seventy-four. He probably never realized what a liar he was making out of the professional depreciationist.

The fraud which would have been perpetrated upon the public if the theory of "depreciation" which is being exploited as a profession by demagogues and impostors, had been adopted by public service companies years ago, when they were starting in business, would have been on a par with the fraud which these charlatans now undertake to perpetrate upon the companies. This would be true even if there were such a thing as life expectancy in plant and equipment. But there is no such thing. Aside from what may be deemed to be the *wearing parts* of a complete system; including such small units as rails, ties, poles, gas and electric meters, etc., *retirements of units for wear and tear do not occur*. They have, therefore, no determinable life. The date when, if ever, they will be withdrawn from service because of obsolescence and inadequacy cannot be even approximated, because the date and character of future inventions and of the development of the community cannot be foretold.

The so-called "depreciation" theory involves the creation of a useless reserve. In the case of the Brooklyn Edison Company before the New York Public Service

Commission for the First District, a very thorough detailed appraisal was made of the Company's property, and the Commission's engineer demonstrated that under the so-called theory of straight line depreciation, the company would acquire a depreciation reserve, on a property amounting to twenty-four millions of dollars, of something over eight millions of dollars, *which would never be used or useful to the company or the consumer.* The methods and figures were set forth clearly in the testimony in the case. Such a reserve is construed by professional depreciators as evidence either of the repayment to the investor in the utility of a part of his investment, through the medium of the rates which he charges for his service, or of an investment on the part of the patron, through the same medium, in a part of the plant and property employed by the utility in the public service. The first theory would be urged where the volume of business done by a utility was stationary; and the second would be urged where the growth of the business involved additional investment equal to or exceeding the amount accrued in the so-called "depreciation reserve."

Even where no "depreciation reserve" whatever has been created, the professional depreciators argue that one should have been accumulated and that failure to do so is evidence that the property has been "milked" through excessive dividends.

The fact that the so-called "accrued depreciation theory" will not stand the test of application to the future is evidence that it cannot be applied to the past. It cannot be demonstrated, for example, that from the standpoint of either the rate-payer or the company it would be a good theory to impose upon the patrons of the new public service company. Thus considered, the glaring inconsistencies of the theory become at once apparent. It can be proven clearly and conclusively that a so-called "depreciation reserve" actually and knowingly created at the expense of the public, by such a company, if such a thing were possible, could not serve

any useful purpose either to the company which collected it or to the rate-payer who paid it in addition to the actual cost of the service he received. It would be of no advantage to the company, because (among other reasons) it would add nothing to its investment upon which it would be allowed to earn a return. It would be of no advantage to the rate-payer, because it would add to his rates, without giving him, as an individual (and he must be considered, in this connection, only in his individual capacity), anything in return for his money; he would get title to nothing in the way of property, and the fact that future rate-payers might benefit from the amounts exacted from him would not interest him in the least.

For a concrete example, consider the history of the average gas company: It is organized, capital raised, a plant constructed, the latest and best types of apparatus installed therein, and mains, services and meters installed on the district to be served. Do the projectors visualize the plant and equipment in which their capital is invested as moving relentlessly towards the scrap-heap as humanity marches from the cradle to the grave? Verily they do not. Do they construe the situation as demanding that they begin, at once, to collect from their consumers, in the rates, over and above the cost of the service and a fair return on the investment, the investment itself or any part of it? Such a thing was never attempted or even dreamed of. They look upon the permanency of their plant and equipment as second to nothing ever created by mortal hand. They know that there will be wear and tear which will involve repairs which, as they are made, will and should constitute a part of the current cost of the service. They know that such cost, as a matter of practice, is not, and should not be, collected in advance, for the obvious reason that the earnings for each year should bear the burden of the maintenance expenditures for each year, otherwise the statement of results of a year's operations, in so far

as the revenue and expenses are concerned, is distorted; that to exact from rate-payers, during a given year, an amount in excess of the expenditures for maintenance for such year is "robbing Peter to pay Paul," that is, if the amount thus exacted is used to pay for future maintenance and if future patrons benefit thereby; that if it is not so used, such an exaction results in the creation and maintenance of a reserve which will be forever useless for the purpose of making replacements, which is the purpose for which it was alleged to have been created; that to deal with maintenance costs as they occur is to deal with facts, but that to attempt to anticipate them is to embark upon an uncharted sea of idle fancy and speculation. They take no heed whatever of future obsolescence or inadequacy, for two reasons: first, because not being clairvoyant, they cannot foresee when, *if ever*, obsolescence or inadequacy in respect of any unit of plant or equipment is going to occur, and, second, because, being business men, they know that when, if ever, obsolescence or inadequacy does occur, it will result from an advance in the art or a development of the business which should and will, *itself*, take care of the loss involved in the displacement of the retired unit of plant or equipment. They know, therefore, that there is no economic ground upon which they could demand from their patrons a return of their investment or any part of it. They know, furthermore, that they could not collect it if they attempted to do so, for two reasons: first, that the public would object to paying for the service any amount in excess of the *cost* of it plus a fair return on the investment necessary to render it; second, because an attempt to build up a business with a rate thus burdened with a purely fictitious and uneconomic charge, would result in failure and bankruptcy.

What actually occurs may be described as follows:

Assume the case of a gas company, starting business in a small and growing municipality.

It has been organized in response to an urgent demand on the part of the community for a supply of gas for illuminating, domestic and commercial purposes.

Its organizers are citizens having some money to invest and some credit.

The territory is canvassed and as many contracts for service are made as can be obtained.

A franchise is obtained, a consulting engineer is called in, and estimates are made of the probable present consumption and what may be reasonably expected in the way of annual increases therein.

A price is fixed which, it is estimated, will ultimately yield a return upon the necessary investment. The investment in land and manufacturing plant is of necessity based upon an estimated future demand substantially greater than that which can be expected to be realized at the outset.

A distributing system is installed, which covers the more densely populated section of the municipality.

The business of supplying gas is begun under conditions which make it impossible for the company to recover all of its operating expenses.

Then comes a period of discouragement. The company is in financial stress. All the anticipated business may not have been realized (it seldom is). A receivership is discussed. Temporary loans, to meet payrolls and bills for materials and supplies, obtained from those who have already sunk capital in the enterprise, tide the company over this critical period of its career.

By vigorous canvassing and judicious extensions, the utilization of the property is increased, so that the gross revenues exceed the operating expenses and leave a balance toward over-due fixed charges.

The plant and distributing system being new, the maintenance charges are comparatively negligible.

As business grows without proportionate additional investment of capital, net earnings increase; likewise

the cost of maintenance through repairs and replacements begins to be a factor in the cost of operation.

By the time the company is fairly on its feet and is able to pay a return upon the money invested in it, the cost of maintaining the property by repairs and renewals has become normal. In other words, it has reached an average annual relationship to the company's gross earnings, and such relationship thereafter will vary but slightly. That is to say, a sum representing a given percentage of the gross earnings (which may be expressed in terms per thousand cubic feet of gas sold) will suffice to keep the property in a high state of service efficiency.

The foregoing is what happens in actual practice and is a true picture of the early history of practically every utility.

Had the company undertaken at the outset to collect from the public a rate which would have included a return to it of half, or any part, of its capital within a given number of years, it would have gone bankrupt, unless its patrons, aware of its intention so to do, enjoined it from charging a rate for its service which included such return or repayment of its capital.

It is impossible to imagine a utility so situated as tempting to collect from its patrons, during a period when it was struggling for existence, a useless reserve which could be construed, upon final analysis, as nothing else than a return to it of a part of its investment, or that it would be permitted to do such a thing. And if, up to the time it had gotten upon its feet and was meeting, out of its gross earnings, all of its current requirements for the maintenance and upkeep of its property, it had collected no such reserve, what excuse would exist thereafter for its undertaking to do so?

Thereafter, normal and reasonable rates for gas will be such as to enable it to meet its operating expenses, to maintain its property by renewals and replacements when necessary, and to earn a fair return upon its invest-

ment. Such being the case, the accumulation of a reserve would involve an unreasonable increase in its rates.

Does any one imagine that it would be permitted, much less ordered, to increase its rates for the purpose of creating a useless reserve? If nothing may be properly collected for that purpose, then it is obvious that no deduction may properly be made from its investment; in other words, no depreciation exists in respect of its property.

Investors, as a class, engage in public service enterprises because they deem them to be not only profitable but permanent. Money put into railroad construction, for example, can never be withdrawn. To *unmake* a railroad would restore no amount of cash to those who constructed it. It would require the expenditure of almost as much money in the unmaking as in the making—if not more. The same is true of gas-mains, electric-conduits and all sub-surface structures required in the distribution of gas, electric, telephone, telegraph, steam and water service. It would not pay to dig them up. Similarly, there can be no recovery of money invested in plant and equipment. There is no considerable market for second-hand plant and equipment. Therefore, were it not for the *permanent* character of the public service business there would be no public service, because no investor would embark in it as a business. Assured, as he has every reason to be, of the permanence of the business, he looks, with equal reason, for a fair return on his investment. In other words, he expects to collect enough for his service, in excess of the cost of rendering it, to cover not only bare interest on the amount of his investment but a reasonable margin of profit besides. The cost of rendering the service includes, of course, the cost of maintaining his plant and equipment in efficient operating condition by repairs and renewals, as well as the cost of amortizing the investment in plant and equipment displaced from time to time in order to effect improvements and economies made possible by

the advance in the art of rendering the particular service in which he is engaged. In the exercise of his right to earn a fair return upon his investment, he is entitled to and should receive the protection of the courts.

The amount which he collects in excess of the cost of rendering the service, is his profit, to be disposed of as he may see fit. That is to say, he may pay it out in dividends or carry it in a surplus account or segregate it and carry it in a reserve account, or he may do all three of these things. The profits which he does not take out in the shape of dividends he may employ in the acquisition of additional plant and property; and when thus employed, they become an investment of his in the same degree precisely as does the cash represented by the company's outstanding capital stock and obligations. He expects to have this investment maintained, without impairment, out of the rates which he collects for his service.

The rates which an investor charges for his services include nothing which may be construed either as a return to him of any of his investment or as a sum advanced to him by his patrons to be invested by him for their account in plant and property. No investor has ever been a party to such an understanding; and it cannot, therefore, be assumed that, without his knowledge or consent, amounts were included in his rates for either of the purposes named. The reasons for this are obvious and will be elaborated later.

On the other hand, the point of view of the public—that is to say, the patron of the investor—is as simple as the point of view of the investor. He is a buyer of service. He pays for it a price which he understands represents two things, first, the cost of rendering the service, including the repairs and renewals of the plant and equipment employed in rendering the service, and, second, a profit to the investor. So long as that profit is fair and reasonable, *i. e.*, equal to a fair and reasonable return on the investment, he is not interested in the

disposition that is made of it; that is to say, he is not interested in whether it is all paid out in dividends, or whether part is paid out in dividends and part set aside in surplus and reserve accounts and invested in additional plant and equipment. He knows that an investment of undivided profits in plant and equipment is in the nature of a short cut amounting to the same thing as a payment of all the profits in dividends and a re-investment involving an issue of securities and that the difference between these two methods is one of form and not of substance. He does not consider that there is included in the rate he pays for the service he receives any amount representing (a) a return to the investor of a part of his investment or (b) an investment on his own part in some of the property employed in rendering the service which he receives. Being satisfied that the rate which he pays covers the two items heretofore enumerated, viz: the cost of the service and a reasonable profit to the investor, he would not consent (if he were consulted) to have such rate increased in order that there might be included therein an amount designed for either of the other purposes named. Therefore, there is no ground on which to base an assumption that, without his knowledge and without any intent on his part, there was ever included in the rates which he paid for the service he received any amount in addition to the cost of the service and a fair profit to the investor.

Notwithstanding the manifest absence of any knowledge or intent, on the part of the investor or his patron, to engage at any time in any such preposterous transaction as is alleged to have been in effect, we have nevertheless in this so-called "depreciation theory," a theory by which its advocates attempt to establish a division of the property operated by a utility between that which is owned by the company and that which is owned by the public. According to these professional depreciators, the company may earn a return upon so much of the property as the depreciators are willing to con-

cede belongs to the company; but upon that portion of it which they allege belongs to the public, no return may be earned. It is to be hoped, however, that we have not yet reached the stage, in this country, where title to property may be disputed upon so flimsy a pretext.

Even if it were deemed advisable that henceforth, as a matter of policy, an investment should be made by the public in properties operated by utilities, through the medium of the rates charged for the service, it is difficult to conceive how such a policy could be made effective. It would be necessary, for example, that the policy should become universal. It would then be necessary to ascertain by inventory and appraisal the value of the property of every utility in the country. Rates for service would have to be increased universally, so that there might be included therein a percentage designed to apply either toward the purchase of existing plant and property or toward the purchase of plant and property to be acquired thereafter. Thereafter, the amount thus invested might be known; but how about the property in which investment has already been made?

In view of the fact that all plants would be acquired by utilities in their own names, how would the title thereto become vested in the public? The rate-payers of yesterday are not the rate-payers of today and the rate-payers of today are not the rate-payers of tomorrow. Why should the rate-payer of today pay for something which is to be owned by the rate-payer of tomorrow? In which of the various classes of property required by a utility would the public prefer to have its investment made, and for which class of property would the utility itself have a preference? It is but necessary to consider these few questions to establish the absurdity of the whole proposition.

Furthermore, there is not the remotest possibility that the public, if fully informed, would lend its approval to such a hare-brained proposition.

The effect of the propaganda of the professional deprecators and of the decisions of some courts and commissions which have appeared to sustain it, have been to render investors uneasy.

Those who are already in are not going in any deeper, and those who are not in will stay out until this propaganda has had its final quietus. This attitude on the part of investors is a distinct and palpable public disadvantage. Confidence in the stability of their investments is indispensable to the ready flow of capital to meet the public demand for increased and improved service and for the development of vast territories at present without railroads, gas, electric, telephone or telegraph service. Is it not the time to call a halt on the activities of men whose principal aim in life appears to be to impair the investments in properties devoted to the public service and whose usefulness is on a par with that of the Russian Bolsheviks?

The so-called "depreciation theory" begins with imaginary premises, progresses through academic meanderings and emerges as pure nonsense. It has not a leg to stand on in public policy, economics, finance or common sense. Nevertheless, so plausibly has it been presented and so active has been the propaganda in its behalf that some courts and commissions have accepted it as the law and gospel of utility valuation. It has even been accepted and availed of by some public service companies, the result, it must be assumed, of a superficial consideration of the whole subject of plant maintenance and upkeep. Some members of the engineering fraternity who by training or study are neither economists nor financiers but who have been impressed with the magnificent vocabulary of this new pseudo-science, have swallowed the bolus whole. Other engineers who have studied the questions and who have not been impressed by the claims made for this new elixir of life, have rejected it altogether. One State Commission has

already reversed itself in this regard and has eliminated from its accounting system any recognition of the theory.

An inspection of the plant and equipment of an operating company, at any time, would disclose nothing more respecting the life expectancy of the units thereof than an inspection of it at the time the company started business. It would disclose, however, in respect of the wearing parts of such plant and equipment, including such small parts as rails, ties, poles, gas and electric meters, etc., that at some time, more or less remote, as the case might be, repairs and replacements would have to be made to make good wear and tear. But just as the current income is taking care of similar current repairs and replacements, the future income will take care of future repairs and replacements, as they become necessary. To attempt to keep plant and equipment always in a condition as good as new would be wasteful and extravagant. It would add immeasurably to the cost of the service without producing any compensating advantages to the rate-payer. In other words, the *service condition* of a plant and equipment may be as *good as new* without the plant itself being in a condition as good as new. It adds nothing, for example, to the serviceability of a structure to paint it more often than is economically necessary. It adds nothing to the serviceability of a machine to replace a wearing part that is still giving as good service as a new part would give.

At any time, an engineer may discount—not accurately but approximately—the ultimate cost of the repairs and replacements of working parts, including small units, which a physical inspection of a plant and equipment discloses will have to be made in the near or remote future. He may estimate the cost of replacing a rail, he may make a more or less wild guess as to the date when it will have to be replaced, he may adopt some rate of interest; and with these three factors and an interest table, he may determine the present sum of money which, at the given rate of interest, will be the

amount which it will ultimately cost to replace the rail. He may make a similar computation with respect to a gas-meter or a pole supporting electric wires. But when he has done so, he has determined nothing as to the investment in the property. The condition of the particular units of plant and equipment on which he bases his computation is only a temporary one. It is a mere incident of plant and equipment operation. It possesses no economic significance whatever. As the sum computed will be paid out of the rate collected from the rate-payers, as repairs and replacements mature, it may be described as an "unmatured obligation" of the rate-payers to reimburse the company for maintenance of the plant and equipment, through the medium of the rates which they pay for the service they receive. There is no more reason for collecting such expense in advance than there is for collecting *this year* the salaries and wages to be paid *two or three years hence*; and as a matter of business practice, it is never done.

The fact that, as a matter of accounting practice, some companies have a repair suspense account or a renewal and replacement suspense account to equalize the annual charges against the earnings, for repairs or renewals, is, of course, a matter of no consequence whatever. Such accounts at any given time may be either debit or credit accounts.

Since there is no sound basis in public policy, law, economics or finance for collecting, in advance of the necessity for using the money, a so-called "depreciation reserve," it follows that, where no such reserve has been created, the investment remains unimpaired. It may even be assumed, in cases where, under a mistaken conception of the problem of plant maintenance or under the compulsion of commission order, a "depreciation reserve" has been created, that nevertheless the investment remains intact. In order to sustain the contrary, it would have to be affirmatively shown that the reserve actually constituted a return directly or indirectly of

capital to the investor or that it actually represented an investment on the part of the rate-payers, with their knowledge and consent and with the company's knowledge and consent, in plant and equipment bought by the company, paid for with its money and to which it holds an indisputable vested and legal title. It would have to be shown that the earnings, during the period the reserve was accumulating, plus the reserve itself, constituted more than a fair return, in fact an excessive and illegal return, on the actual investment. The mere fact that the reserve was created through operating expenses instead of through income account is not controlling. Economic facts cannot be disturbed by the mere incidence of bookkeeping. Accountants are neither financiers nor economists. Questions of property rights cannot be determined by the entries they make in their books. In other words, the *substance* of the question cannot yield to the *form* which the accountant has chanced to observe in making his book entries. If by any other process of reasoning the investment may be concluded to have become impaired, then it is evident that property, which may not yet be taken by the direct action of the syndicalists, may be taken indirectly by ingenuous sophistries.

An investor's property represents his investment and is in fact his investment. It is immaterial that on the other side of his balance sheet his investment is represented by given amounts of capital stock, funded and floating debt and surplus and reserves. The aggregate of these, corresponding with the aggregate of his assets, indicate his *book* investment, which may or may not be his *actual* present investment. In other words, if the land he owns has substantially enhanced in value, its enhanced value measures the amount of his investment therein. It is not necessary that he should sell it and buy it again and credit the increment in value to his surplus account in order to determine his actual investment. The courts of this state have so definitely decided.

The Supreme Court of the United States has ruled that the present value is the controlling consideration in respect of *all property*. While it is obvious that there is no economic difference between the land and plant to which an investor holds title, it is still a question of *policy* whether, as to plant, a claim should be set up for recognition of the present investment therein, when present unit costs are *deemed* to be abnormal and temporary.

The question really hinges on whether an investor in plant and equipment devoted to the public service is in a different class from an investor in real estate, merchandise or salable commodities, in that he may not realize on the increment in the value of his property, by being allowed to earn a return upon such increment, however it may have been created, during the period that it may be shown to exist, but is forever confined to his original investment upon which he is entitled to earn a fair return; in other words, whether any injustice is done the user of the service if the rate he pays at any given time provides a fair return on the investment in the property devoted to his service, measured by the cost of reproducing the plant and equipment at that time.

It is not proposed to elaborate upon this theme here. Suffice it to say that, in determining a reasonable rate or in reviewing an established or prescribed rate, it is obviously the function of the court or commission to determine the *investment* upon which a fair return must be permitted. Whether this shall be the *original* investment or the *present* investment is for the court to determine. In either event, the investment must be deemed to be *unimpaired*.

It is equally obvious that it is the function of the engineer to inform the mind of the court as to facts and not as to theories of economics or finance or rules of law, about which an engineer, as an engineer, has no expert knowledge or experience. The facts, as to which the engineer is competent to testify as an expert, are

the inventory of the plant and the original and present investment therein.

The court will base its conclusion as to which investment it will adopt upon the circumstances of the case. It is a matter for argument by counsel.

When an engineer, testifying in a rate case, expresses his conclusions as to the extent of present liability to make future repairs and replacements in terms of diminished value, he leaves his own jurisdiction to wander in that of the economists. Before he can justify any estimate of value, he must know what value is. Is the depreciated value to which he testifies market value, or exchange value? Is it value estimated by considering what each depreciated item would sell for alone, or what the whole plant would sell for altogether? Or is his value estimated on consideration of potential utility and, if it is so considered, is it utility to the owner as a means of making money, or is it utility to the community served, measured by what the community would rather pay than lose the service and use the next best substitute? Is there such a thing as "use value" and such another thing as "exchange value," or is exchange value, either subjective or objective, the only kind of value there is? Or is the engineer measuring "value for rate purposes" and, if he is, what kind of value is it that is "value for rate purposes?"

What has an engineer to do with the thousand and one theories of what value is, and how shall he have the hardihood to attempt to measure it before he knows what it is that he is measuring? He may as well furnish charts showing average lengths of the beaks and tails of hippocrits.

Engineering has to do with physical facts and measurements of physical bodies. It concerns itself with costs, both past and present. An engineer may testify as to such costs; but when he testifies that the value of plant and equipment has decreased in some specified amount or percentage, either because of assumed expiration of

life of the units of which the plant is composed, or because maintenance, presently unmatured will, later on, make it necessary to expend money, he is usurping the functions of economists and courts. He is following some academic "method," without being able or competent to explain why "half life half value" or similar phrases, have more significance than the linguistic efforts of a parrot.

On the other hand, an engineer may testify to the amount of the investment, either the original or present investment. If the books do not show it, he may estimate it approximately. That is his true function. He may estimate the probable original cost or the probable cost of reproduction at present prices. He may express the total as value, if he makes it clear that by value he means costs, computed on one basis or another; but, having made such an estimate of value, on the basis that value means investment, he cannot properly reduce it after shifting to the theory that value means "what a thing will sell for," or that it decreases proportionately with a diminished store of potential utility. That is precisely what he does when he blithely converts "condition per cent.," into dollars and cents under the heading "present value."

The investment stated by the engineer should not in all cases purport to be the amount of the entire investment which is to be considered in a rate case. The New York Court of Appeals has ruled, in the Kings County Lighting Company case (210 N. Y. 479), "wholly apart from the intangible thing called going business, the reproductive value today of the physical property would not necessarily include the actual and legitimate investment in tangible property which may have been entirely replaced, not because of depreciation, but to meet advances in mechanical science, new conditions and increasing demands not reasonably to have been foreseen at the start. * * * In some manner and under some heading a due allowance must be made for the investment

in those elements." The engineer, if requested, may properly testify as to the amount of such investment, on the basis of cost of construction; but the matter of adding such amounts to his estimate of the investment value of property presently in use, or of disregarding such amounts, is dependent upon other questions. Has the amount of such investment been wholly or partly amortized by the rates? This is a question of accounting. Should any amount not so amortized be added to the rate base? That is a matter of law.

It is not too much to say that conclusions of engineering experts have been accepted by courts and commissions as based on facts wholly within the scope of engineering science, whereas they are partly founded on opinions as to economics, accountancy and law, although the whole basis of opinion has not been perceived either by the courts or by engineers themselves, and that no inconsiderable part of the difficulties with which public utilities have been struggling have their origin in the ready acceptance by courts and commissions of the opinion of engineers as to matters in which they, as a rule, are not qualified to testify as experts.

It is obvious that this subject is one which concerns and should engage the serious attention of every investor in public utility securities. It cannot be assumed, for it is not true, that the matter is receiving the attention it should from those whom investors have intrusted with the protection of their interests. Bankers, attorneys, engineers and accountants have, as a rule, given it but scant consideration. Many have accepted the utterances of doctrinaries as the last word on the subject. Accounting rules prescribed by Commissions, which are based upon the acceptance of false theories, have been regarded as controlling when they are not.

It is "up to you," therefore, Mr. Investor, to see that, in respect of your particular investments, you are receiving adequate protection. Do not wait until your company is confronted with a rate case to discover that with-

out your knowledge or consent a condition of affairs has been established in the accounts of your company, through the acceptance of false doctrines and economic theories, which jeopardizes your interests and adds immeasurably to the task of protecting your property from confiscation. If an action is brought against your company to reduce its rates, see that only such lawyers, engineers and financial experts are engaged to defend it as have studied this subject and are familiar with every phase of it and are prepared and qualified to protect their clients' interests.

It was not the intention of the writer to cite any opinions, either of courts, commissions, economists or engineers, sustaining the views herein expressed. There is one case, however, that of the Pocatello (Idaho) Water Company, which so well illustrates the application of sound economics, sound law and sound common sense that he ventures to subjoin an extract from the opinion of Public Utility Commissioner Ramstedt, which was practically sustained by the Court, the opinion of the majority having been overruled; an extract from the opinion of the Court in that case, in which it was finally decided that so-called "accrued depreciation" should not be deducted from the value of the properties of public utilities; and an editorial comment on the case which appeared in the New York Commercial. It may be assumed, in respect of the first sentence of his opinion, that Commissioner Ramstedt would qualify it in respect of such units as are only displaced because of obsolescence or inadequacy, and which, being composed of stone, concrete, iron and steel, would last as long as the walls of Carcassonne. Stephenson's second locomotive was still in use in 1911 ("Engineering and Contracting," October 11, 1911). The cast-iron water-pipes leading from the river Seine to the fountains at Versailles, were installed in 1658. The only repairs that have been necessary after two and a half centuries of service is the occasional replacing of bolts ("Engineering and Contracting," May

27, 1914). Rome is still supplied with water by an aqueduct the construction of which was begun by Quintus Marcius in 144 B. C. Tunis is now supplied by an aqueduct built by Hadrian in A. D. 120. The aqueduct at Nimes has been in use for nearly twenty centuries. There are many other instances of masonry and concrete structures which have survived many hundreds of years of useful service.

The italics are ours.

Extract from Commissioner Ramstedt's opinion:

"Physical depreciation, resulting from use, decay and the action of the elements, is a constant factor commencing simultaneously with construction and ending with replacement. A person, having invested his money in a continuous business enterprise for the benefit of others, as in the case of the petitioner herein, and in so doing having subjected his property to the control of the state, from which control it cannot be withdrawn, must always be ready and able to meet the public demand and to replace the constructive portions of his plant from time to time as they wear out and decay. A person having embarked on such an enterprise is justly entitled to compensation to cover this depreciation in addition to a fair return, over and above expenses, upon the reasonable value of the property which he has employed for public use, for the same reason that a laborer using his tools is entitled to wages which will not only compensate him for his services, but enable him to replace his tools as they wear out. Allowance for depreciation cannot, in my judgment, be considered as profit or an earning factor in the business. The expenditure necessary to make replacements at any time may exceed the amount received up to that time to cover the cost of such replacements; on the other hand, the cost of making replacements, at a certain time may be very much less than the amount received up to that time to cover depreciation. The theory of allowance to cover depreciation must be that in the long run the owner will be reimbursed for the money which he must spend in making replacements, which in the

very nature of his business he must make from time to time. The fact that the amount he has received from the public at any time is either greater or less than the amount which he has expended for replacements, if the allowance for depreciation is correctly computed, does not affect the returns to which he is justly entitled on his original investment. *He is entitled to a fair return on his investment* and to hold the undepreciated property, or its equivalent in value, which he has employed for public use.

"The fact that in an investigation of the petitioner's property, undertaken at this particular time, for the purpose of fixing rates, it is found that the market value of his physical property employed for public use has depreciated \$77,188.39, does not, in my judgment, justify the Commission, in its determination of a fair value for rate purposes, to deduct the amount of depreciation from the present estimated cost of reproducing the property now, and thereby reduce the earning power of his property. The petitioner has undoubtedly in the past twenty years made such replacements from time to time as the public service demanded, and must at all times be prepared to make such replacements as the public service justly demands. The depreciation which we now find in the physical value of the property is somewhat in the nature of incumbrance which must be taken care of sooner or later and without increase in rates by reason thereof; in fact, a large portion of the improvements which under the order of the Commission, he is required to make within the year is really replacements, and *I cannot see how we can justly decrease the earning power of his property by decreasing the investment on which he may earn a fair return.* Whenever the time comes when any great amount of replacement is necessary, and that may be at any time, he may be required to expend all that he has ever received to cover depreciation and a good portion of his earnings."

Extract from the Court's opinion:

"So far as the question of depreciation is concerned, we think deduction should be made only for actual, tangible depreciation, and not for theoretical

depreciation, sometimes called 'accrued depreciation.' In other words, if it be demonstrated that the plant is in good operating condition and giving as good service as a new plant, then, *the question of depreciation may be entirely disregarded.*"

Editorial from New York Commercial:

"Rate-making is based on the costs of operation and maintenance and on the money invested in the plant, no matter what may be the nature of the service rendered to the public. It is usually easy to estimate current expenses and income. The sticking point is almost always the valuation of the plant of any public utility. Its original cost may be proved beyond dispute but the allowance for depreciation is always a bone of contention.

"Why should a private corporation be asked or forced to forego returns *on money actually invested because some years have elapsed?* If a municipality constructs a water system the ratepayers bear the cost. If mistakes were made at the beginning the bonds issued must be paid at maturity no matter how the money was spent. Every great public work is liable to contain some defect which must be replaced. Human skill has never prevented all mistakes. The engineers who dug the Panama Canal have been powerless to stop the slides in the Culebra Cut and dredging them out will add to the cost of the Panama Canal unknown millions of dollars. If inventors and engineers did not experiment we would make little progress, and money so spent is not wasted though it yield no direct profits.

"When a public utility company scraps old equipment and installs improved machinery it serves the public and should receive a fair return on all it spends in this way. Physical depreciation is a constant factor and is balanced by repairs and replacements. The Supreme Court of Idaho has reversed an order of the Public Utilities Commission of that state by disallowing a deduction from the value of a water company's property of so-called 'accrued depreciation' which was theoretical and not actual, the plant being in condition to give as good service as when first constructed. The Court found that the company

made such replacements as were necessary to serve the public and that *an arbitrary decrease in the investment* on which it was entitled to a fair return *was unjustified*. The sum involved was \$77,000, *the deduction of which would be equivalent to confiscation without recompense*. This case upholds the right of investors to receive a return on money properly expended in the first place."



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